

THE NEW HÆMATOLOGY

AS A

METHOD OF DIAGNOSIS

WITH OBSERVATIONS ON THE TECHNIQUE.

BY

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PRICE ONE SHILLING NET.



Published by

THE MEDICAL TIMES PUBLISHING CO., LTD.,

17-18, BASINGHALL STREET, LONDON, E.C.

22 5008 8599 5



The New Hæmatology as a Method of Diagnosis.

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INTRODUCTORY.

IT is a singular fact that, while the blood is the easiest of all the constituents of the human body to examine, it is yet one of the least known. One reason for this is that our research scientists insist upon making their observations upon it in an unnatural or dead state. They subject it to all sorts of chemical processes, stain it with dyes, laboriously count the number of its red and white corpuscles, and waste valuable time in testing the supposed microbe-eating capacity of the white corpuscle in the process known as finding the "Opsonic Index." All this painstaking and strenuous labour might be saved if our practitioners would but take the trouble to investigate the blood on their own account, instead of leaving the work exclusively to bacteriological specialists. All that is needed is a good microscope and a determination to master the technique of examining the blood in its fresh living state.

The science of "Diagnosis from the Blood" was first brought to perfection by Dr. Watkins, of New York. In the year 1902 he published a masterful work on this subject, teeming with absorbingly interesting facts, and illustrated with beautiful microphotographs of both healthy and diseased living blood. As one might naturally expect, this book is practically unknown, either to bacteriological and hæmatology workers, or to general practitioners, and, to all intents and purposes, is likely to remain unknown until some great awakening occurs.

In the hands of a doctor who is versed in the appearance of the living blood, in health and disease, a horoscope can, as it were, be formed of the patient's true mental and physical condition. To a large



HEALTHY BLOOD.

extent, likewise, the degree and type of illness can be determined and diagnosed.

TECHNIQUE OF FRESH BLOOD TESTING.

To obtain a satisfactory microscopical slide for the purpose of examining the living blood diagnostically the details of the process must be carefully observed. It is then quite easy.

GOOD QUALITY THICK GLASS SLIDES.

The first requisite is glass slides of the usual size. These should possess ground edges and be free from

scratches and flaws of any kind. They should also be made from thick, or patent plate, glass as the thin glass often selected by some microscopical workers is disadvantageous for fresh blood testing. The mere bending of the glass under the pressure of the fingers disarranges the formation of the blood film when settling, and may permanently spoil it for further examination.

THIN COVER GLASSES.

The No. 1 very thin cover glasses are usually the best to use for this purpose, as they are light and exert a minimum of strain upon the flowing blood. They can also be utilised for oil immersion examinations should this be subsequently thought necessary. For ordinary work, where a patient's blood can be tested at once, the round three-quarter circles will suffice, but if a little time must elapse the large squares are best, as they hold the flowing blood for a longer time, and the setting of the blood in its characteristic formation takes longer.

SCRUPULOUS CLEANLINESS.

The glass slides and cover slips must be quite clean, and free from grease, dust and stains. When purchased, if not quite clean, they should first be soaked in strong soda water or Hudson's Extract, in a glass dish, then well rinsed in clean water, and finally given a soaking in diluted sulphuric acid. After a final rinse in clean water they can be carefully dried with a clean handkerchief or linen duster. If much blood testing is done, and fresh blood testing is made a routine practice, the old slides which accumulate can be used again if they are allowed to go through the cleansing process named. They must be left in the alkaline water until the cover slips are detached, when the slides and cover glass can be cleaned separately.

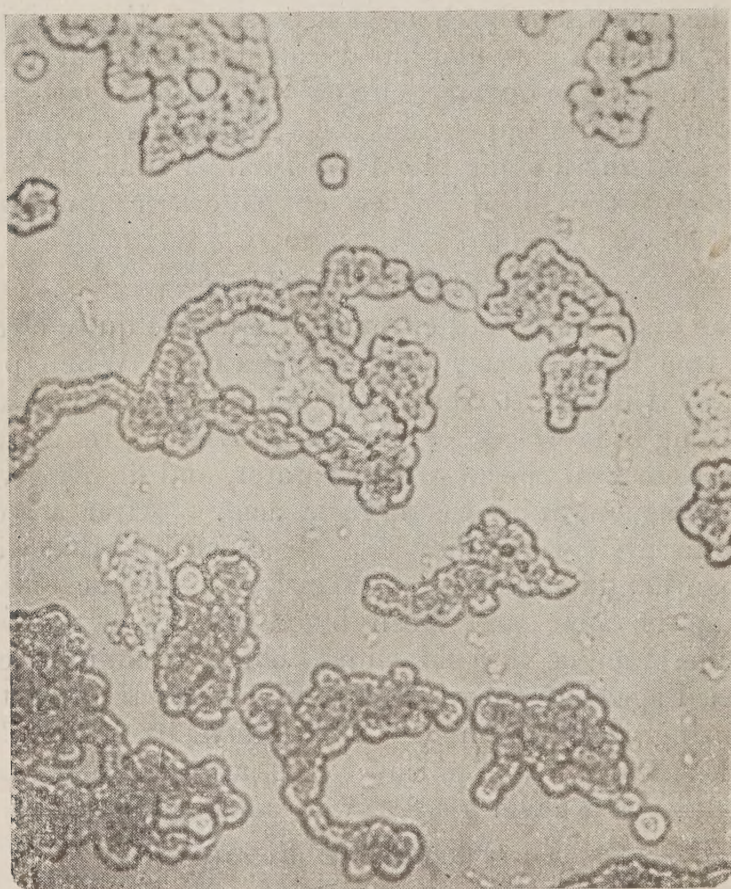
OBTAINING THE BLOOD.

To obtain blood for the purpose of making a test, a blood lancet is needed. This should preferably possess a lance-headed v-shaped point, and should be shielded with a screw-on vulcanite cap to regulate the amount of lancet-head bared. A patient with a thick skin or with thick blood needs a deeper prick than one with a thick skin and easily flowing blood.

The blood should be obtained from the back of the forearm, as it can be secured there in its true capillary form. It is not a good plan to take it from the

finger or ear-lobe, since, from the absence of capillaries, the blood flowing from these spots is not truly typical. The forearm possesses other advantages. The prick is practically painless, and it is not necessary to clean and sterilize the skin of the part, although, as a routine treatment, this is perhaps desirable. If the patient's forearm is very hairy a small portion can be cleared by removing hairs with a pair of scissors, or even with a razor.

Having made the small prick into the skin, the next step is to gently squeeze out the drop of blood. This should be of sufficient quantity to completely cover



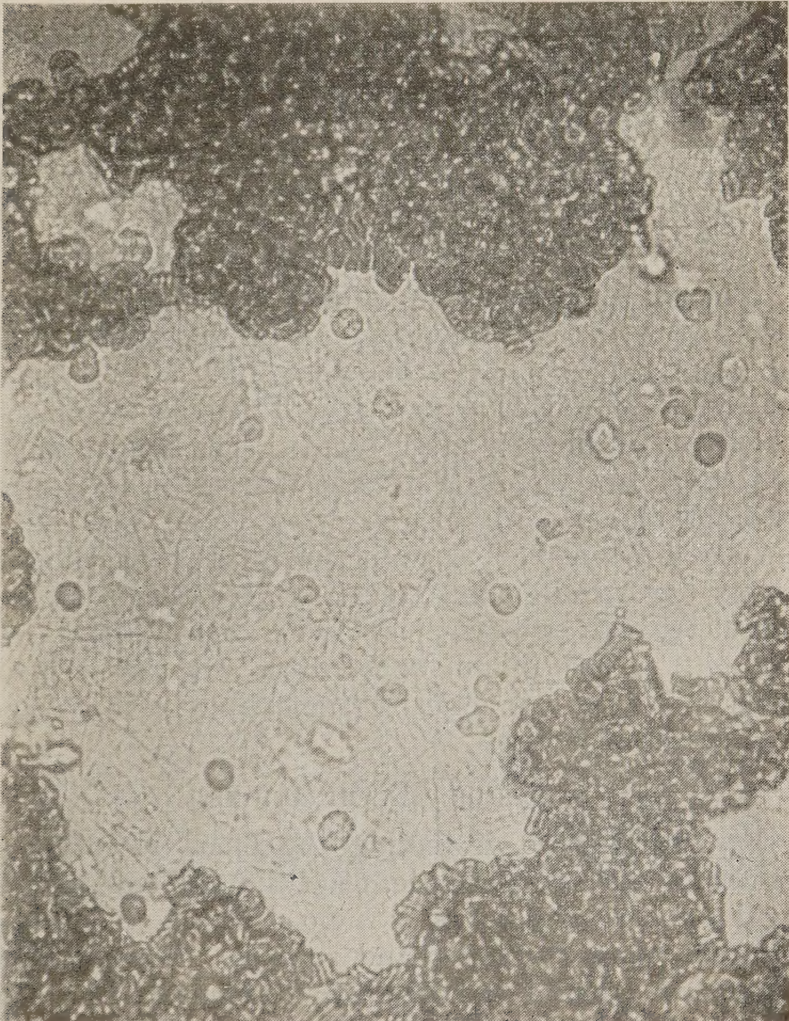
DIPHTHERIA.

and spread over the surface of the cover slip when placed upon the slide. A little practice will enable the operator to gauge this accurately enough.

The drop of blood is now carefully collected upon the edge of the cover slip which is then laid face down upon the slide. The droplet of blood should

then flow slowly and evenly between the two glass surfaces, and the slide is ready for examination.

Too much blood will retard the proper formation and hide up the pattern that subsequently is to form as the blood sets, and also render accurate focussing



SARCOMA ADVANCED.

difficult. Too little blood will cause an imperfect flow, and the film may be studied with air bubbles, thereby retarding a satisfactory examination, and rendering it difficult to obtain a flawless field.

NOTE COLOUR AND MANNER OF FLOWING.

As the film flows in this way it should be carefully scrutinised macroscopically. If of a dark colour, imperfect oxidation is indicated and often gastric inanition. If the flow is slow and tardy thick blood

is present. A health blood droplet should be of a greenish-yellow, approaching to red, colour and should steadily flow from one end of the cover slip to the other.

DETAILS ABOUT THE MICROSCOPE.

A good rigid microscope of the latest pattern, fitted with mechanical stage and a focussing, centering substage condenser, should be used for this work. The mechanical stage is very necessary, as once the glass slide is adjusted upon it it needs no further manipulation. Without this stage any pressure, which is often unavoidable, upon the glass slide, in changing the field with the fingers, may spoil the blood film formation and compel us to prepare a fresh slide.

The centering focussing substage is required, if we want subsequently to photograph the blood film. For all practical purposes a one sixth inch apochromatic objective and No. 4 and No. 6 compensating eye-pieces will suffice for most cases. The apochromatic objectives are essential if we wish to possess good photographic records of our work. If, however, a simple microscopical examination of the blood alone meets our requirements then any good one-sixth inch objective, with two eye-pieces, will answer quite well enough. Good photographic work with fresh blood films is, however, practically impossible without apochromatic objectives

BED-SIDE EXAMINATIONS.

For the purpose of testing the blood rapidly and quickly at a patient's house, or at the bed-side, a light rigid portable microscope is a good thing to possess. This can be easily carried and set up. A mechanical stage and expensive substage condenser must be dispensed with as they add materially to the weight and size of the instrument. Daylight, or a bright lamp, or even a candle can be used as an illuminant.

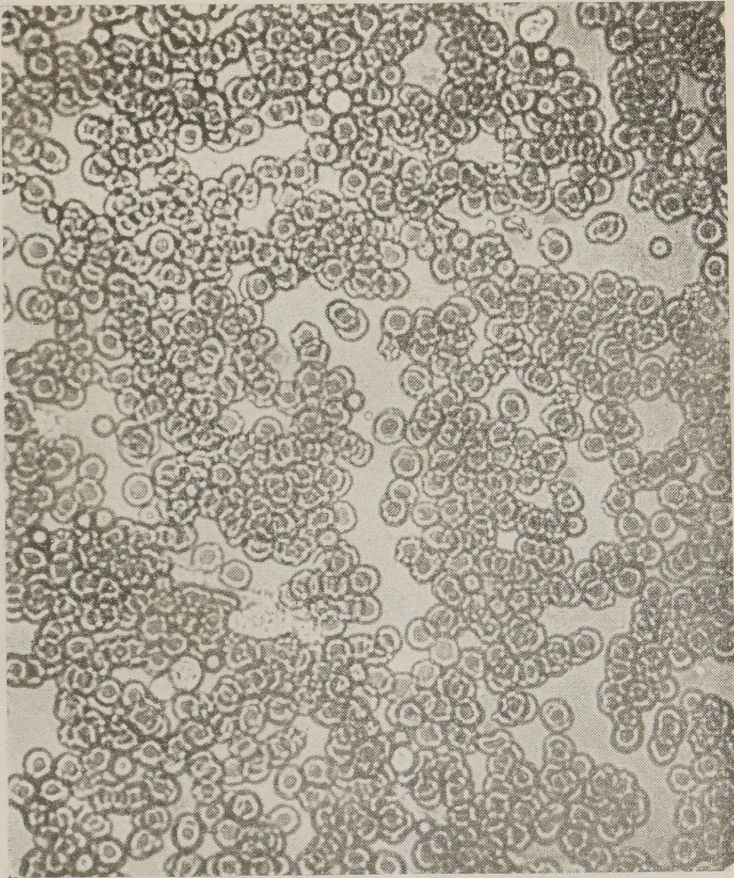
CONSULTING-ROOM WORK.

For consulting room practice the larger and more elaborate instrument, as specified, should always be selected for routine work. The best work can then be done and, if electric light is available, it can be fitted with an electric arc or powerful Nernst lamp as illuminant. A one-twelfth inch objective and a dark ground condenser are desirable additions, as, thereby, more extended observations can be taken in hand upon

the leucocytes, enzymes, fibrin, so-called platelets, granular matter, &c.

THE EDINGER APPARATUS.

The best instrument yet devised for all-round purposes of fresh blood testing is the Leitz Edinger apparatus, originally introduced by Professor Edinger



NEURASTHENIA.

for drawing purposes. Modified to the special requirements of this work it consists of an inverted microscope. It has a powerful illuminant above, is fitted with a rigid table stand, and it has a focussing condenser with Iris diaphragm and a mechanical stage. Below the microscope a camera is fitted and so arranged that the focussing of the image can be done upon a paper screen. If the screen is withdrawn a large-size image (1 by 1,000) can be projected upon another and bigger paper focussing screen below the camera level. Using a one-sixth inch apochromatic objective and a suitably-sized compensating eye-piece the image of the moving or settled blood film can be

readily focussed, and as quickly photographed. On the other hand, withdrawing the paper screen of the camera the larger image can be projected upon the lower screen, and the whole field demonstrated to those in the room. The large image is useful for noting the relative contents of the field in view and can again be photographed in the larger size if need be. At present it is only practicable with this instrument to work with dry objectives, which is its only disadvantage over the ordinary good make of microscopes.

MAKING A DIAGNOSIS.

Assuming that we are fully equipped with materials and apparatus, as specified, we may now proceed to

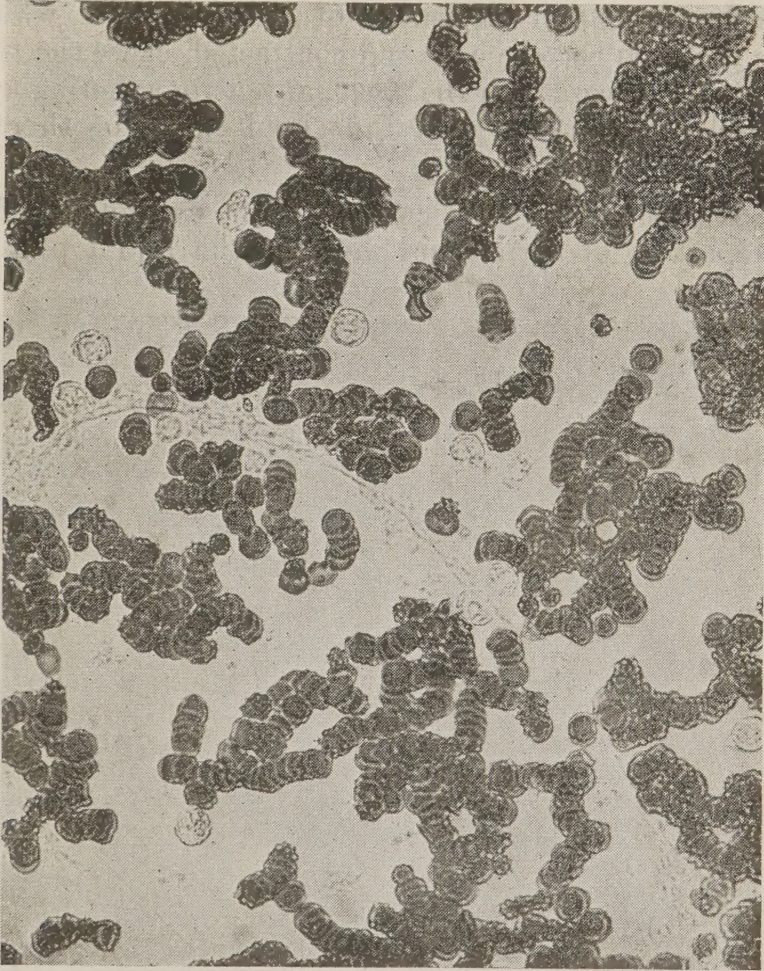


RHEUMATISM.

put the method of fresh blood testing to practical purposes. The drop of blood must be immediately placed upon the microscope stand and its behaviour noted. It should be carefully watched as it moves, by capillary action, between the two glass surfaces. In this way we are able to judge as to the condition of the red cells, and the presence or absence of abnormal constituents.

In health the cells flow in beautiful, smooth detached masses, and they are fully sized and well made. With thin, anæmic, neurasthenic, or devitalised types of blood the cells are seen to flow as separate detached entities deficient in colour, size, or shape.

In cases of catarrh, rheumatism, tuberculosis, sepsis, &c., the red corpuscles present themselves as



MUCUS IN BLOOD. CASE OF SEVERE INFLUENZA.

thick masses which seem to be coated with a sort of varnish-like material, which gives them the appearance of being sticky and adhesive.

As we continue to watch the blood film its movements gradually cease and a characteristic map or pattern forms. This yields further valuable information.

In health we see the full-sized, well-made, well-

detached masses of red cells shape themselves into a uniformly even picture. By reason of their charged-up electro-magnetism, or vitality, the red cells become attached to each other so that they adhere in long vertical chains. This is known as rouleau formation, owing to its resemblance to that of a rouleau chain shown when a row of coins is arranged vertically with the coins placed face to face to each other. This rouleau process is facilitated by the little hollow cups or depressions in the centres of the corpuscles, which, as the cells become cold and contracted, cause the tiny drop of encased air between any two adhering corpuscles to contract and thus hold them together by suction.

Between the red cell pattern we find a due proportion of clear space holding the liquid part of



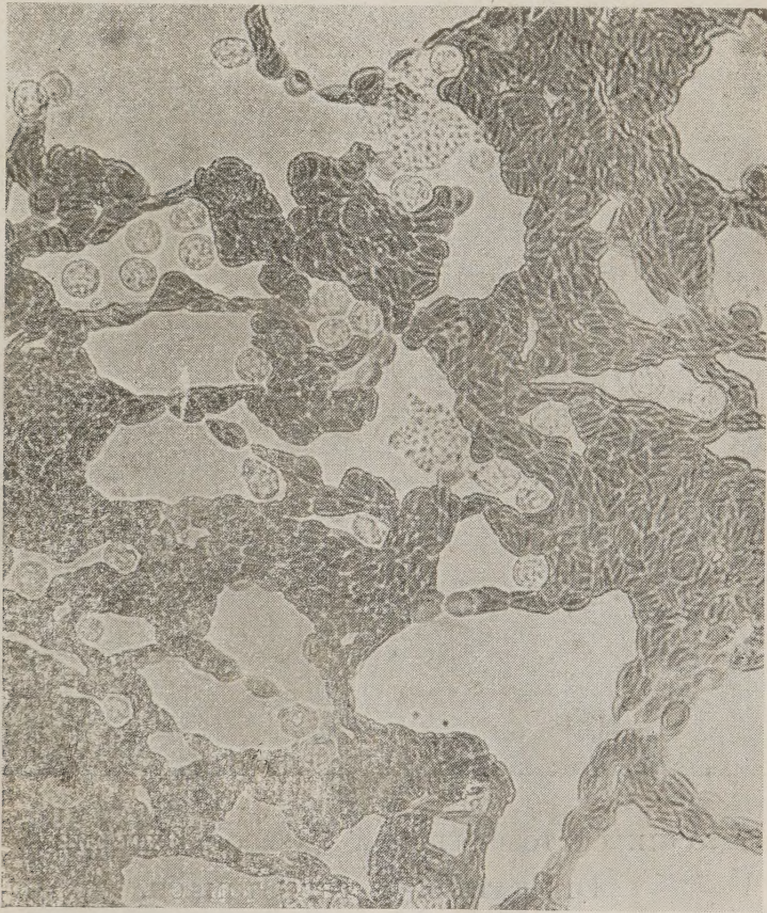
PRETUBERCULOUS.

the blood, called the plasma when in the body, and the serum when out of it. This clear area should be relatively free from abnormal constituents such as fibrin filaments, granular matter, crystals, and other

abnormal elements. Not more than two to four white corpuscles or leucocytes should be present in an ordinary one-sixth inch field.

In conditions of ill-health and disease of the body, we can learn from the pattern that appears under the microscope a great deal about the actual condition of the patient, often without asking a single question.

The red cells may be deficient in number, size, or colour, as in cases of simple anæmia. They may

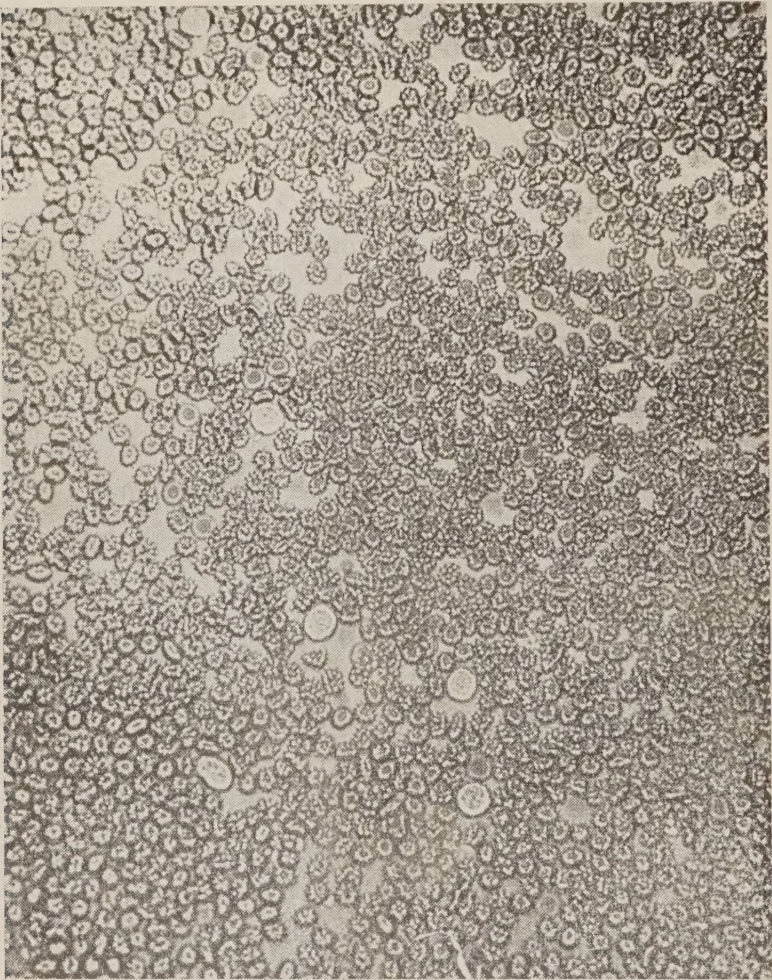


PHTHISIS, ADVANCED.

equally be relatively in excess where the amount of the plasma is deficient as where too much proteid and carbohydrate foods, or alcohol, have been taken.

The rouleau formation may be partial or absent, as in certain nervous and neurasthenic states, or the capacity for creating rouleau may be impossible, owing to the sticky, adhesive, agglutinating attributes of the red cells, as in the rheumatic disorders.

We may see the plasma, showing between the red cell masses, covered with a thick, spider's web of fibrin filaments, as in septic and tuberculous conditions, or crowded with the degenerating and disintegrating



POIKLOCYTOSIS FROM A CASE OF EXTREME
DILATATION OF THE STOMACH.

red cells (commonly termed blood platelets), and we can see the granular matter, or cell debris, which appears when any organ or tissue is breaking down under the stress of disease.

Two distinct types of blood formation predominate, namely :—

Malnutrition, or lack of vitality.—This shows itself in badly-made red cells, which may be deficient in colour, size, number or shape, and, in the settled film, in an inability to form good rouleau. In simple

anæmia we usually see a deficiency of red cells, which may or may not be capable of forming rouleau. In rheumatic or septic anæmias we may have a deficiency of red cells with a relatively marked increase in the fibrin and other plasma contents. In nervous disorders, neurasthenia, as also after fatigue, worry, or anything that impairs the working of the nervous system, we usually find the poikilocytes and microcytes predominating among the red cells, while there will be little or no tendency to form rouleau even when the number of the red cells may be normal.

Supernutrition is shown when the red cells, often in relatively excessive numbers and well formed, are very sticky and adhesive. They aggregate into thick



HEALTHY BLOOD.

masses, which are more or less devoid of rouleau, and large, clear spaces appear between these aggregates of red cells. In these spaces, or seas, fibrin is usually seen in marked excess, with leucocytes, platelets, and other abnormalities. The adhesive condition of the

red corpuscles is due to the action of acids and toxin substances upon the proteid envelopes of the red cells, which are in this manner slowly dissolved. Such acids and toxins, if allowed to remain in the system unchecked, or unneutralised by basic alkalis provided by suitable vegetable foods, will, in course of time, also attack and break down the tissues themselves, as is indicated by the presence of granular matter.

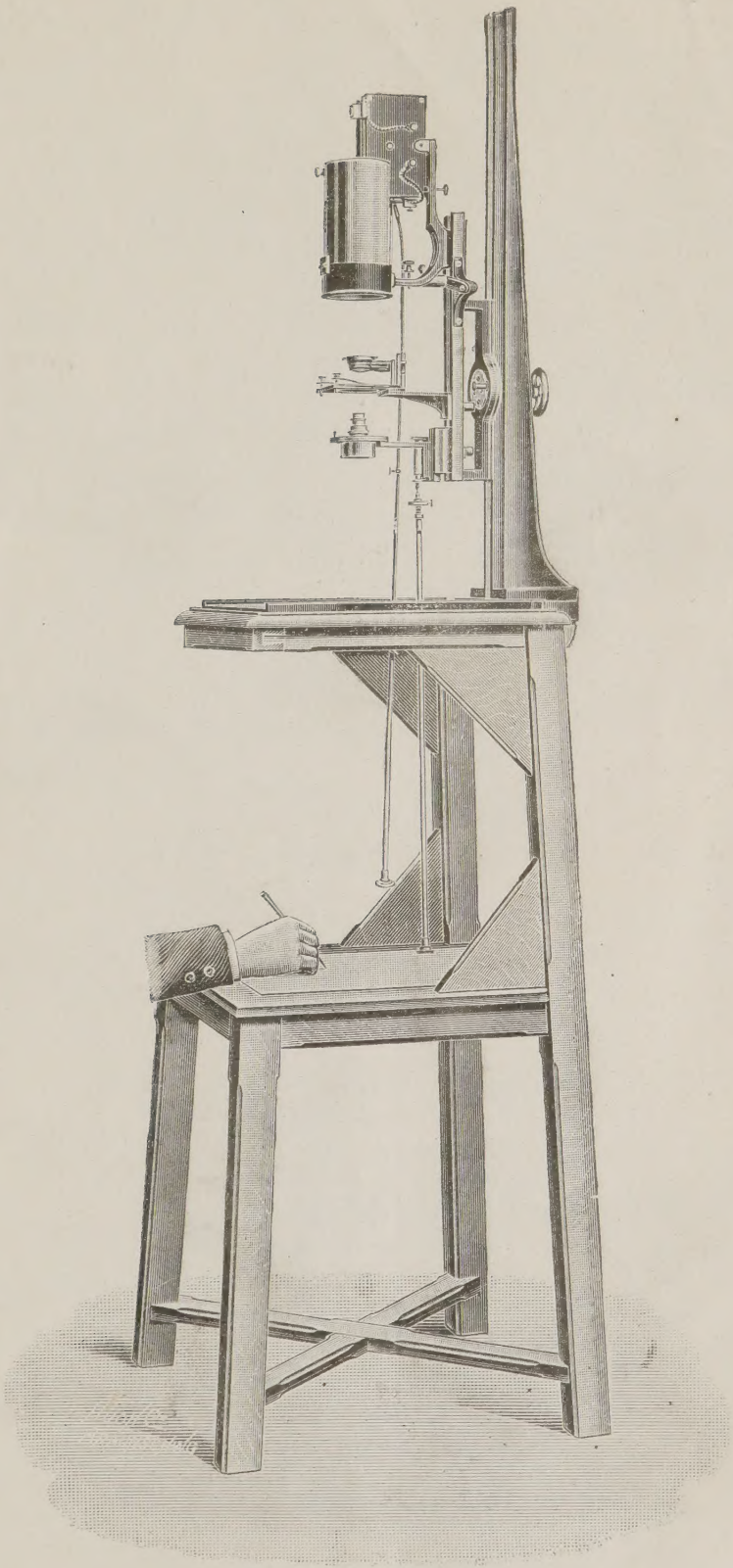
Such, in brief, is the type of information which any medical practitioner can glean from testing the fresh blood. It is not an easy science to learn any more than is any other form of physical diagnosis, but it is exact, and by practice it can be mastered after a few months of careful and assiduous routine work.

Any practitioner who has acquired this knowledge is doubly equipped in collating together his data, for he can then, especially if he combines it with routine excreta testing, make a diagnosis which looks for causes. He will not be satisfied in regarding the symptoms present as necessarily the real source of the disease that he is called upon to treat.

He will note, if we take tuberculosis as an example, that here we have a disease which can be seen maturing, and developing, in the blood for months or years before any physical signs appear in the tissues or lungs. The same applies to other diseases in which the outward and visible signs are now looked upon as the cause of the manifesting disease. In most microbic diseases it enables us to recognise the microbe as the effect rather than as the cause of the disturbed bodily condition.

There is, furthermore, no quackery or deception about this new science of Hæmatology, as anyone who gives it a fair trial will soon discover. Indeed, the information quickly elicited by placing a patient's fresh blood under the microscope is, at times, often priceless. One may often determine, at the bed-side or in the consulting room, the presence or absence of anæmia, neurasthenia, tubercle, sepsis, abscess, or of grave complications, as in cases of appendicitis with threatened abscess. The nature of such complications by ordinary physical methods could only be surmised by inference, or by the costly and tardy process of counting the corpuscles, taking an opsonic index, &c.

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THE EDINGER APPARATUS.

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